00h2E0" 6Z25E560

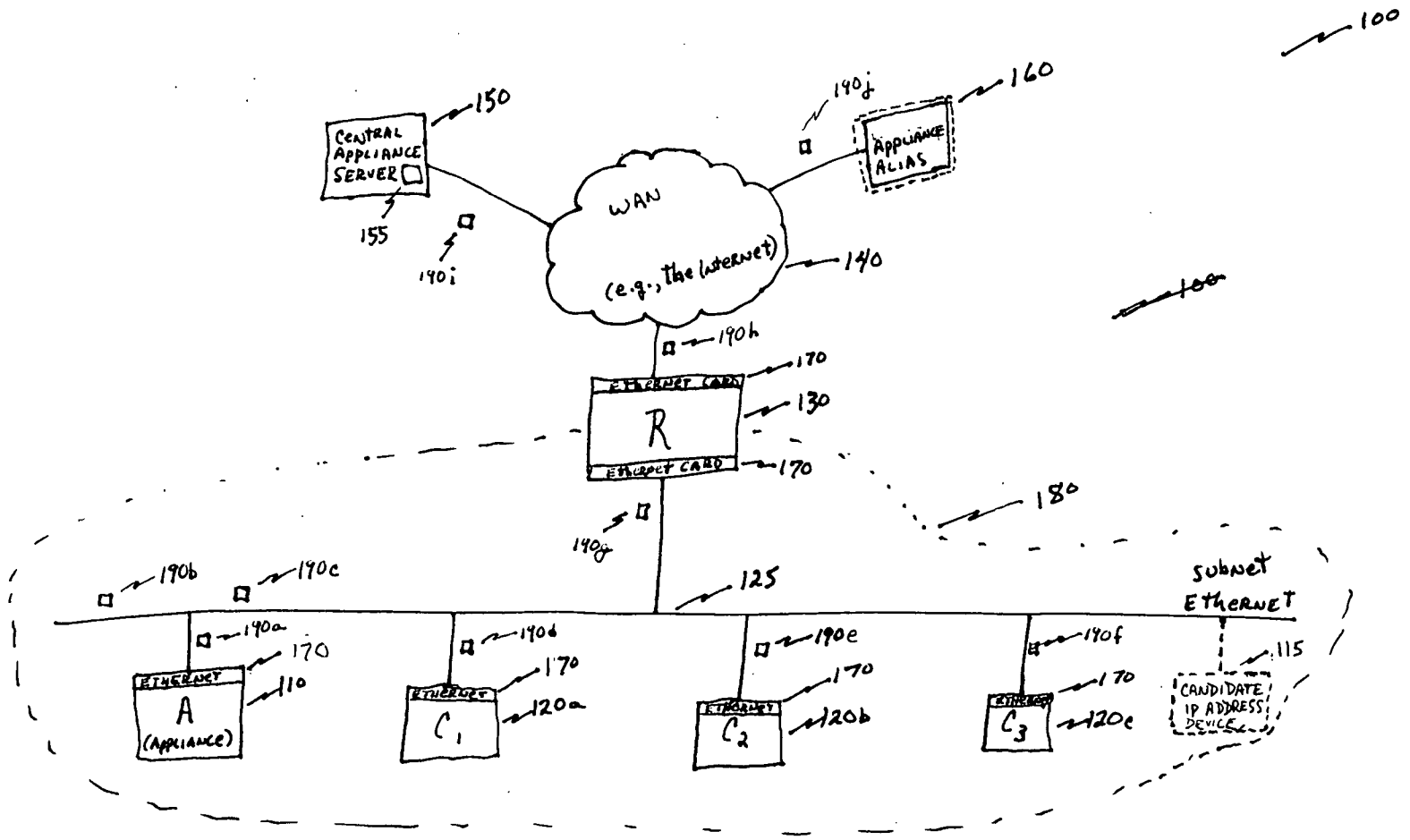

FIG. 1

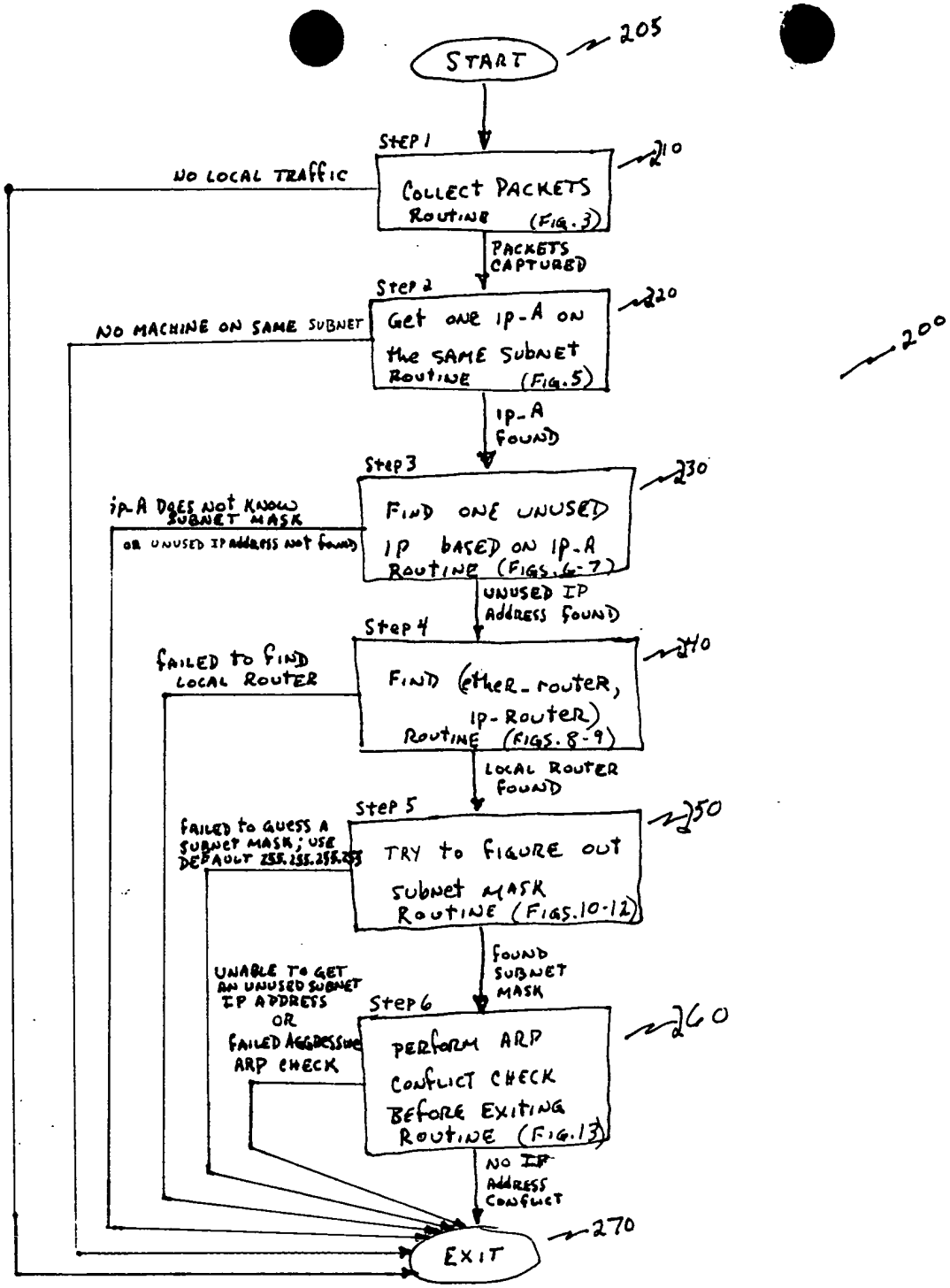
START
205
STEP 1
COLLECT PACKETS ROUTINE (FIG. 3)
210
NO LOCAL TRAFFIC
PACKETS CAPTURED
STEP 2
GET ONE IP-A ON THE SAME SUBNET ROUTINE (FIG. 5)
220
NO MACHINE ON SAME SUBNET
200
IP-A FOUND
STEP 3
FIND ONE UNUSED IP BASED ON IP-A ROUTINE (FIGS. 6-7)
230
IP-A DOES NOT KNOW SUBNET MASK
OR UNUSED IP ADDRESS NOT FOUND
UNUSED IP ADDRESS FOUND
STEP 4
FIND (ether_router, ip-router) ROUTINE (FIGS. 8-9)
240
FAILED TO FIND LOCAL ROUTER
LOCAL ROUTER FOUND
STEP 5
TRY TO FIGURE OUT SUBNET MASK ROUTINE (FIGS. 10-12)
250
FAILED TO GUESS A SUBNET MASK; USE DEFAULT 255.255.255.255
FOUND SUBNET MASK
STEP 6
PERFORM ARP CONFLICT CHECK BEFORE EXITING ROUTINE (FIG. 13)
260
UNABLE TO GET AN UNUSED SUBNET IP ADDRESS OR FAILED AGGRESSIVE ARP CHECK
NO IP ADDRESS CONFLICT
EXIT
270

Fig. 2

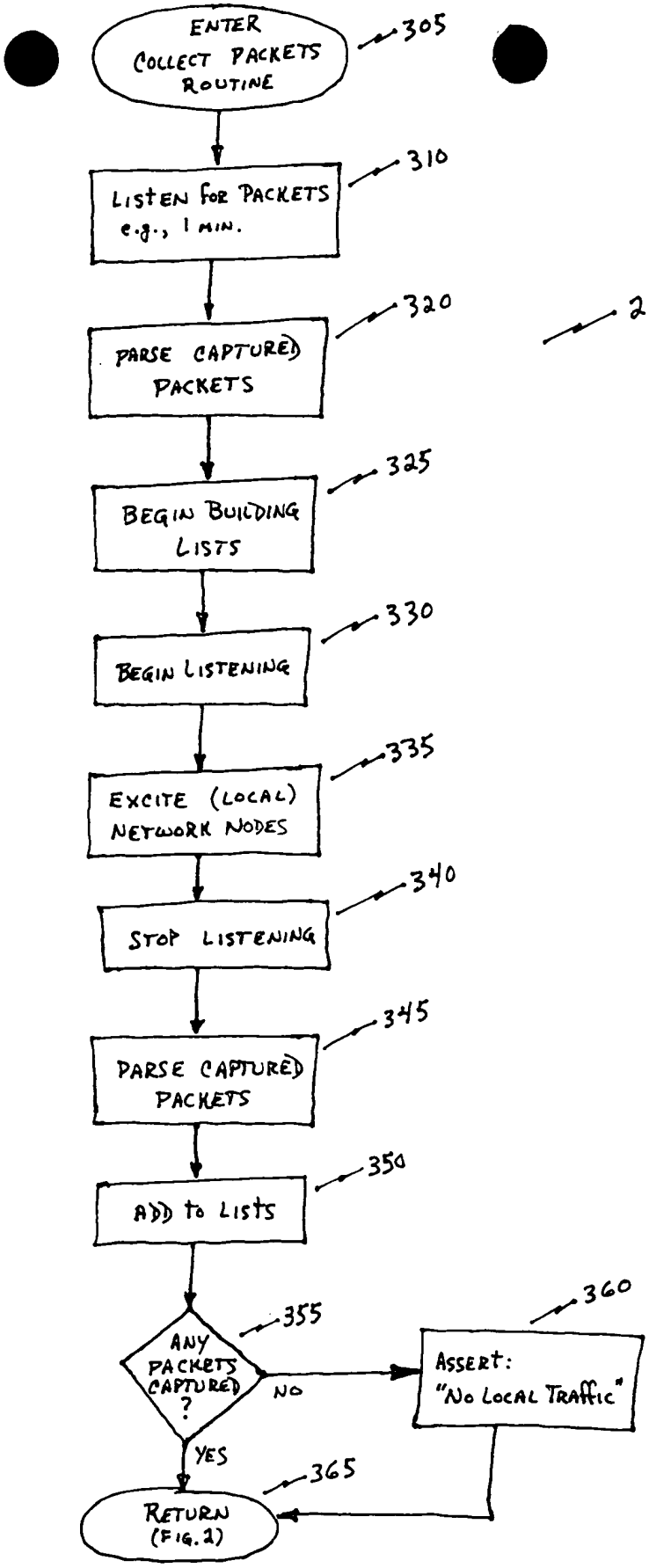
ENTER COLLECT PACKETS ROUTINE
305
LISTEN FOR PACKETS e.g., 1 MIN.
310
PARSE CAPTURED PACKETS
320
210
BEGIN BUILDING LISTS
325
BEGIN LISTENING
330
EXCITE (LOCAL) NETWORK NODES
335
STOP LISTENING
340
PARSE CAPTURED PACKETS
345
ADD to LISTS
350
ANY PACKETS CAPTURED ?
355
NO
ASSERT: "No LOCAL TRAFFIC"
360
YES
RETURN (FIG. 2)
365

FIG. 3

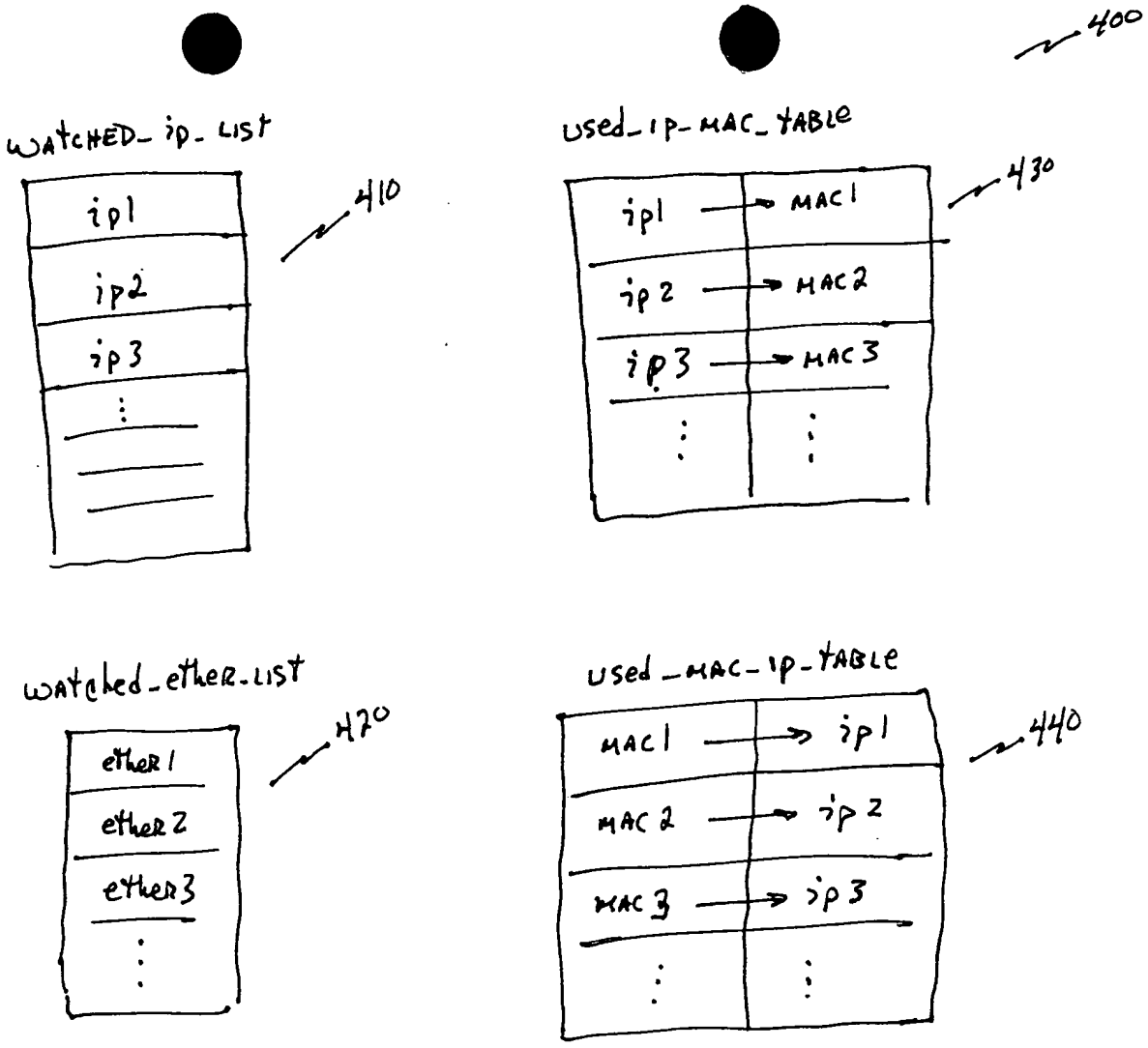
400
WATCHED_ip_LIST
ip1
ip2
ip3
410
used_ip-MAC_TABLE
ip1 → MAC1
ip2 → MAC2
ip3 → MAC3
430
watched_ether_LIST
ether1
ether2
ether3
420
used_MAC_ip_TABLE
MAC1 → ip1
MAC2 → ip2
MAC3 → ip3
440

FIG. 4

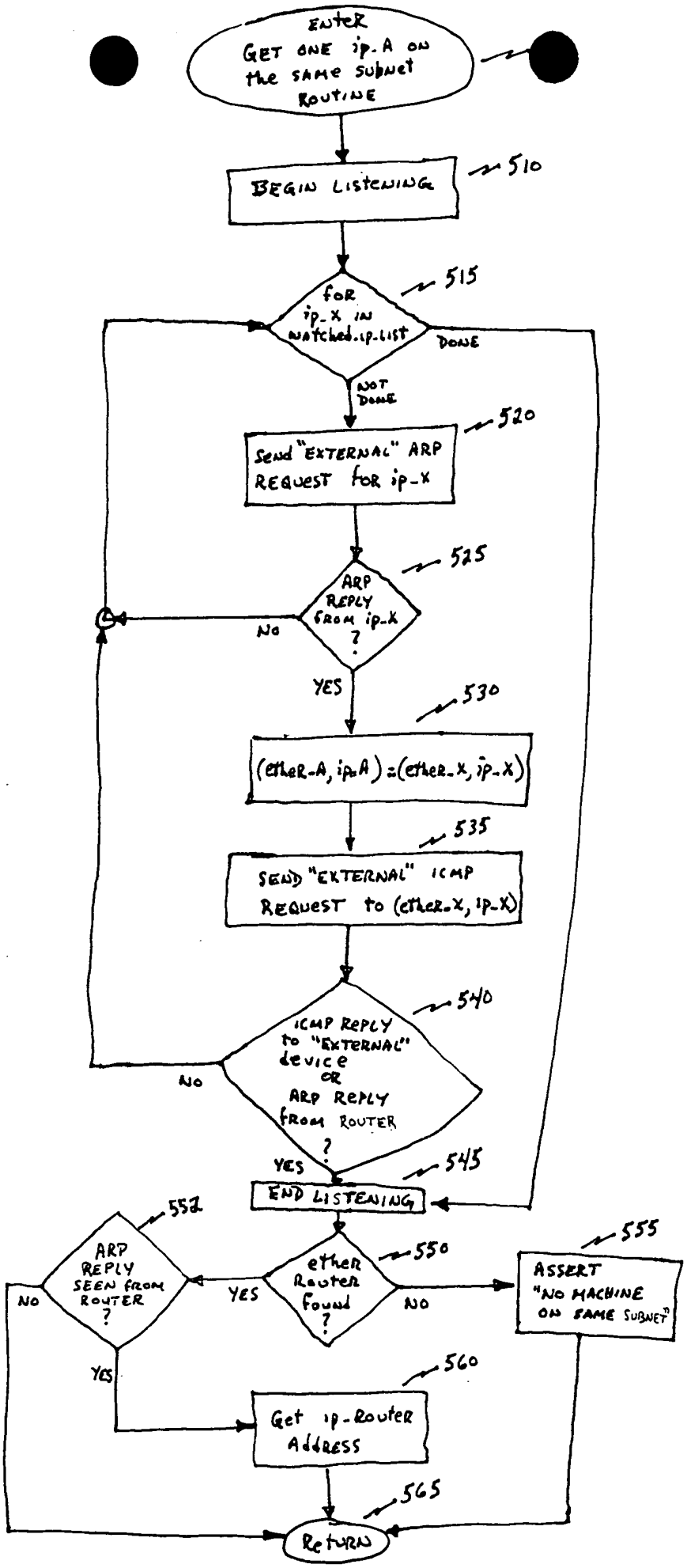
ENTER
GET ONE ip-A on the SAME SUBNET ROUTINE
220
BEGIN LISTENING
510
FOR ip_X IN watched_ip_LIST
515
DONE
NOT DONE
Send "EXTERNAL" ARP REQUEST FOR ip-X
520
ARP REPLY FROM ip-X ?
525
No
YES
(ether-A, ip-A) = (ether-X, ip-X)
530
SEND "EXTERNAL" ICMP REQUEST to (ether-X, ip-X)
535
ICMP REPLY to "EXTERNAL" device OR ARP REPLY FROM ROUTER ?
540
No
YES
END LISTENING
545
ARP REPLY SEEN FROM ROUTER ?
552
NO
YES
ether Router Found ?
550
YES
NO
ASSERT "NO MACHINE ON SAME SUBNET"
555
Get ip-Router Address
560
Return
565

FIG. 5

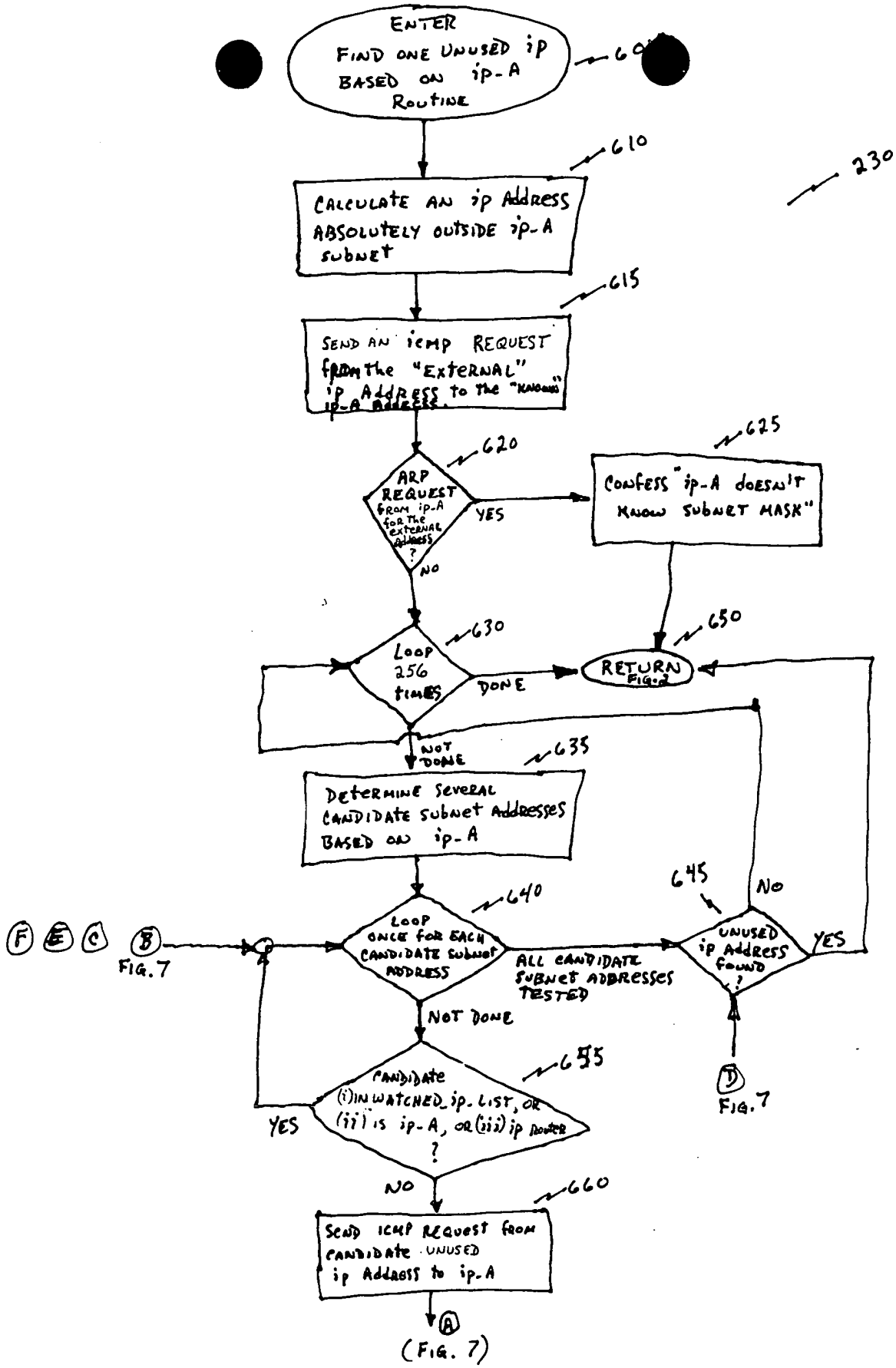
ENTER
FIND ONE UNUSED ip BASED ON ip-A Routine
605
610
CALCULATE AN ip Address ABSOLUTELY OUTSIDE ip-A SUBNET
230
615
SEND AN ICMP REQUEST from the "EXTERNAL" ip Address to the "KNOWN" ip-A Address.
620
ARP REQUEST FROM ip-A for the EXTERNAL Address ?
YES
625
CONFESS "ip-A doesn't KNOW SUBNET MASK"
NO
630
LOOP 256 TIMES
DONE
650
RETURN FIG. 2
NOT DONE
635
DETERMINE SEVERAL CANDIDATE SUBNET Addresses BASED ON ip-A
640
LOOP ONCE FOR EACH CANDIDATE SUBNET ADDRESS
ALL CANDIDATE SUBNET ADDRESSES TESTED
645
UNUSED ip Address found ?
No
YES
NOT DONE
655
CANDIDATE (i) IN WATCHED_ip_LIST, OR (ii) is ip-A, OR (iii) ip Router ?
YES
NO
660
SEND ICMP REQUEST FROM CANDIDATE UNUSED ip Address to ip-A
(A)
(F) (E) (C) (B)
FIG. 7
(D)
FIG. 7

FIG. 6

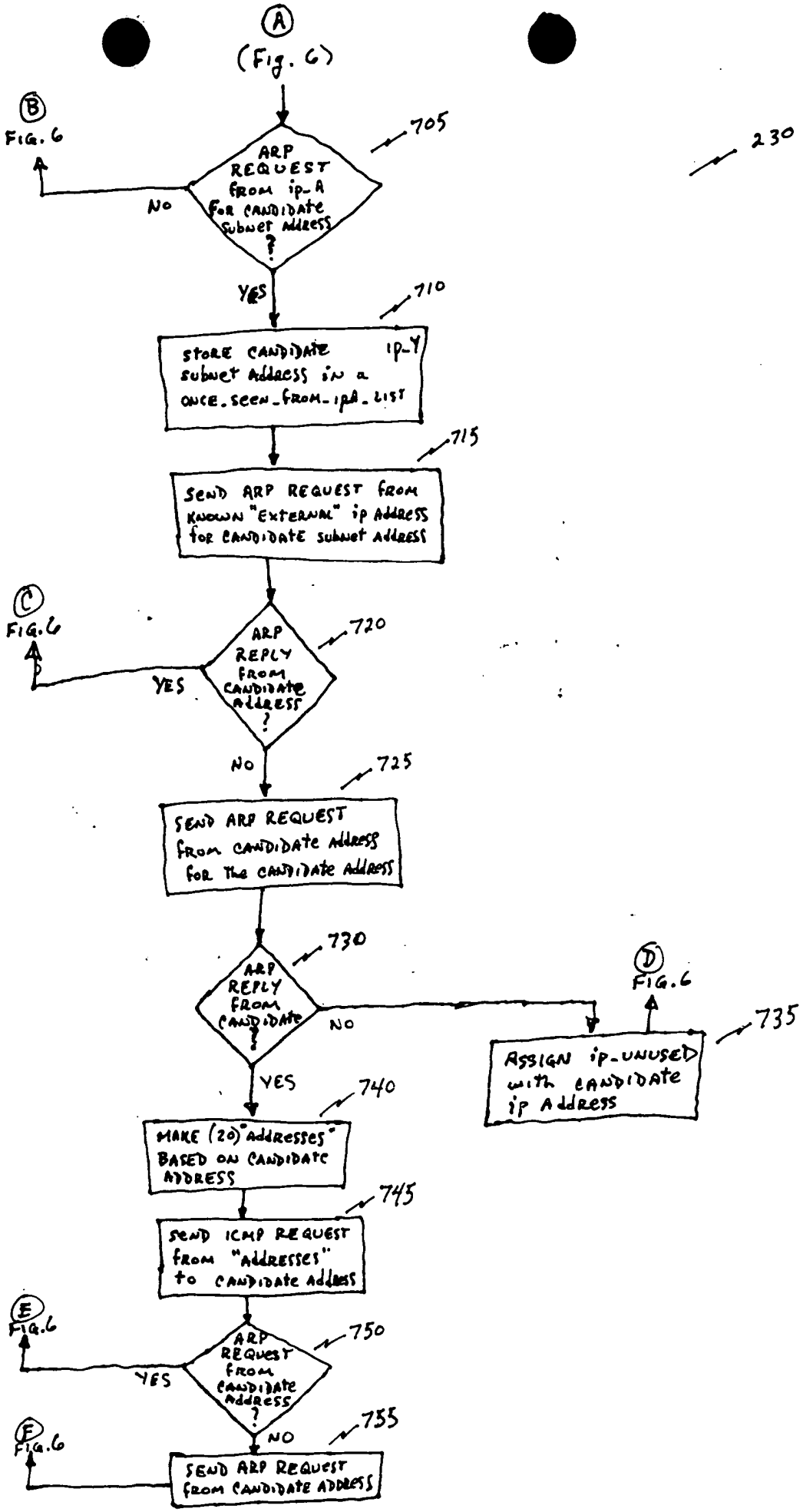
A
(Fig. 6)
B
FIG. 6
705
ARP REQUEST FROM ip-A FOR CANDIDATE Subnet Address ?
No
YES
230
710
STORE CANDIDATE ip-Y subnet Address in a ONCE_SEEN_FROM_ipA_LIST
715
SEND ARP REQUEST FROM KNOWN "EXTERNAL" ip Address FOR CANDIDATE subnet Address
C
FIG. 6
720
ARP REPLY FROM CANDIDATE Address ?
YES
NO
725
SEND ARP REQUEST FROM CANDIDATE Address FOR THE CANDIDATE Address
730
ARP REPLY FROM CANDIDATE ?
NO
D
FIG. 6
735
ASSIGN ip-UNUSED with CANDIDATE ip Address
YES
740
MAKE (20) "addresses" BASED ON CANDIDATE ADDRESS
745
SEND ICMP REQUEST FROM "Addresses" to CANDIDATE Address
E
FIG. 6
750
ARP REQUEST FROM CANDIDATE Address ?
YES
NO
F
FIG. 6
755
SEND ARP REQUEST FROM CANDIDATE ADDRESS

FIG. 7

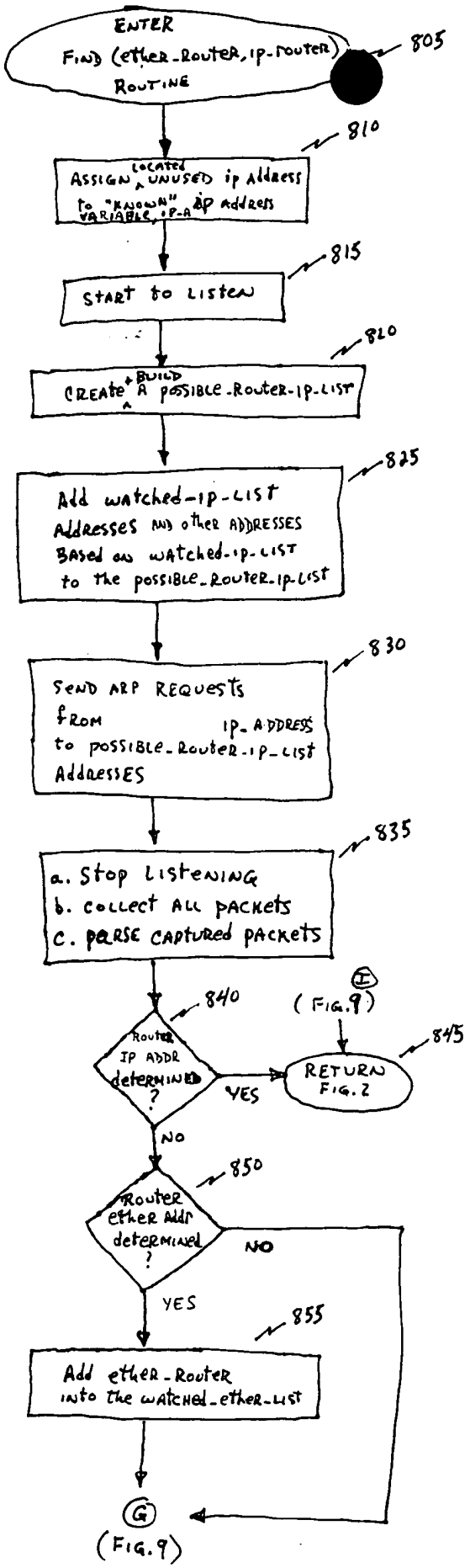
ENTER
FIND (ether_Router, ip-router) ROUTINE
805
P/o STEP 4
240
810
ASSIGN A LOCATED UNUSED ip ADDRESS to "KNOWN" VARIABLE, IP-A
815
START to LISTEN
820
CREATE + BUILD A possible_Router-ip-LIST
825
Add watched-ip-LIST Addresses AND other ADDRESSES Based on watched-ip-LIST to the possible_Router_ip-LIST
830
SEND ARP REQUESTS FROM IP_ADDRESS to possible_Router_ip_LIST Addresses
835
a. Stop LISTENING
b. COLLECT ALL PACKETS
c. PARSE CAPTURED PACKETS
840
(E) (FIG. 9)
Router IP ADDR determined ?
YES
845
RETURN FIG. 2
NO
850
Router ether Addr determined ?
NO
YES
855
Add ether_Router into the watched_ether_LIST
(G)
(FIG. 9)

FIG. 8

P/O Step 4

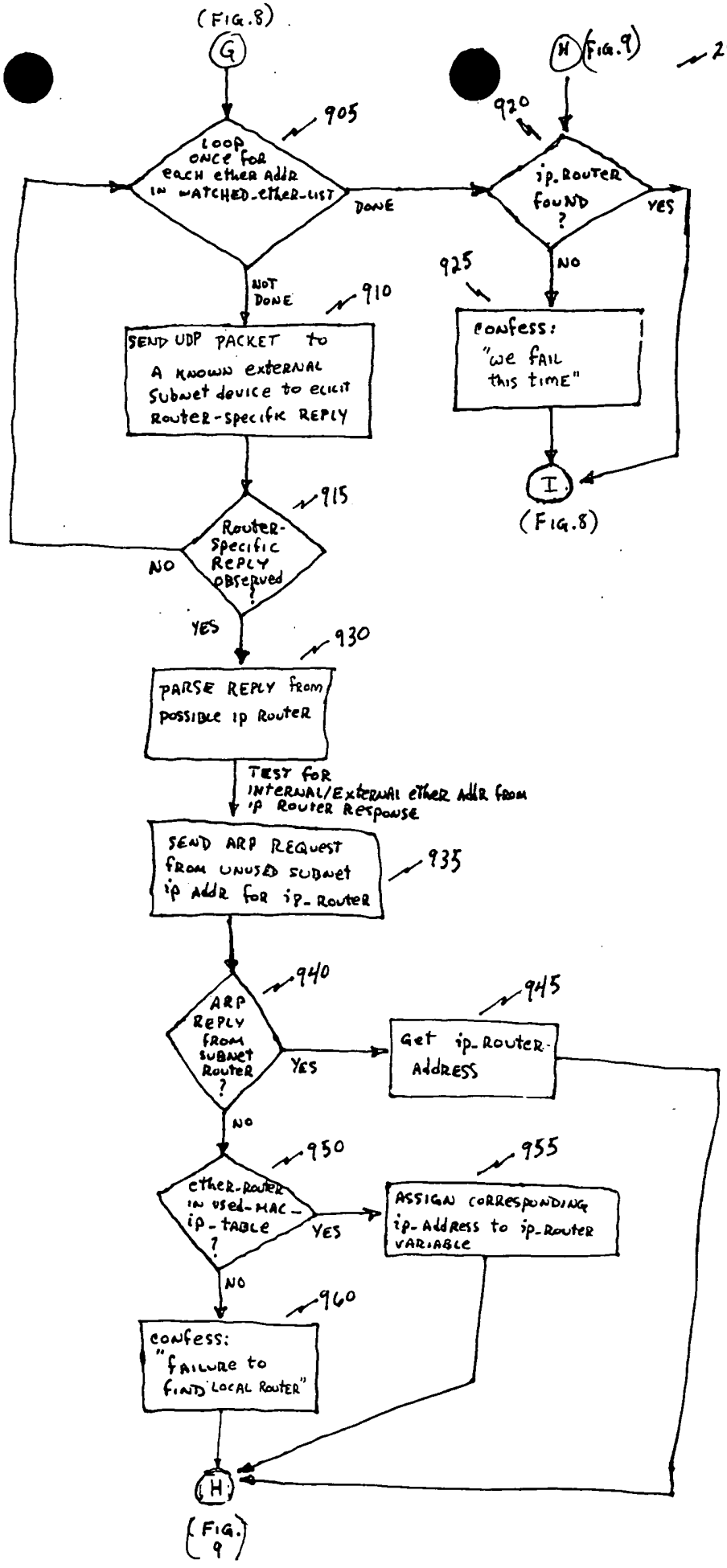

FIG. 9

P/O STEP 5

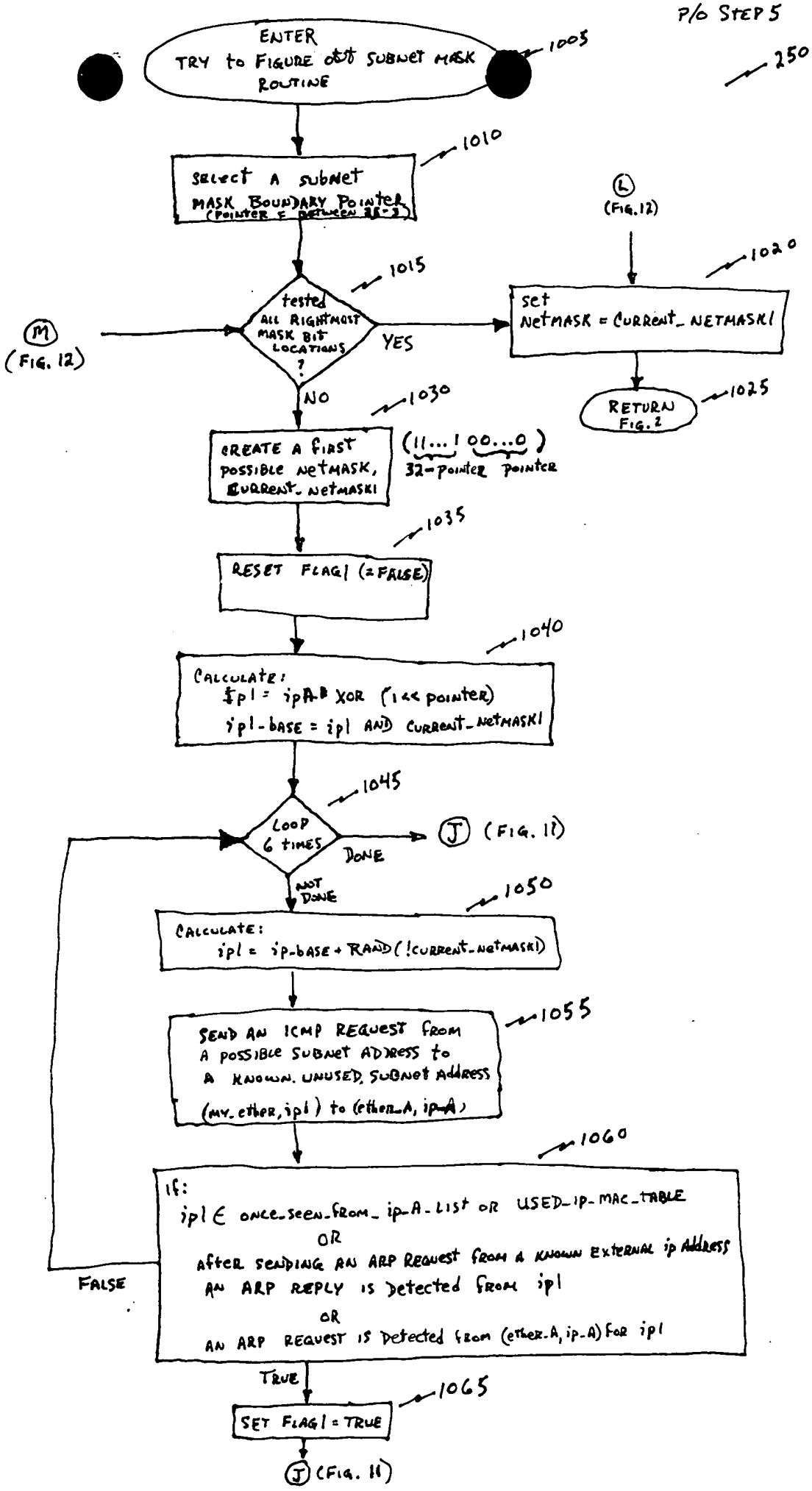

FIG. 10

FIG. 10

P/o STEP 5

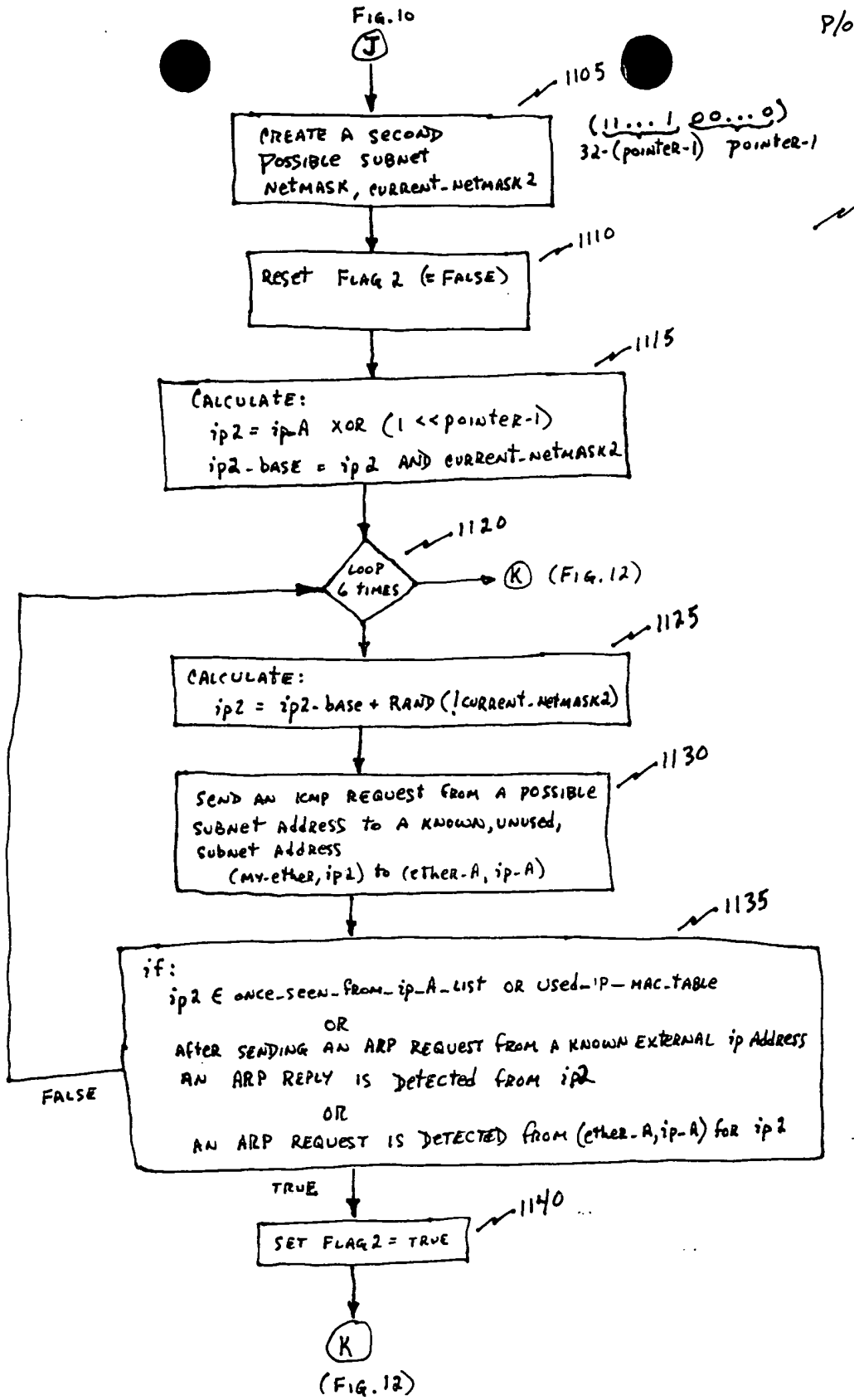

FIG. 11

P/O STEP 5

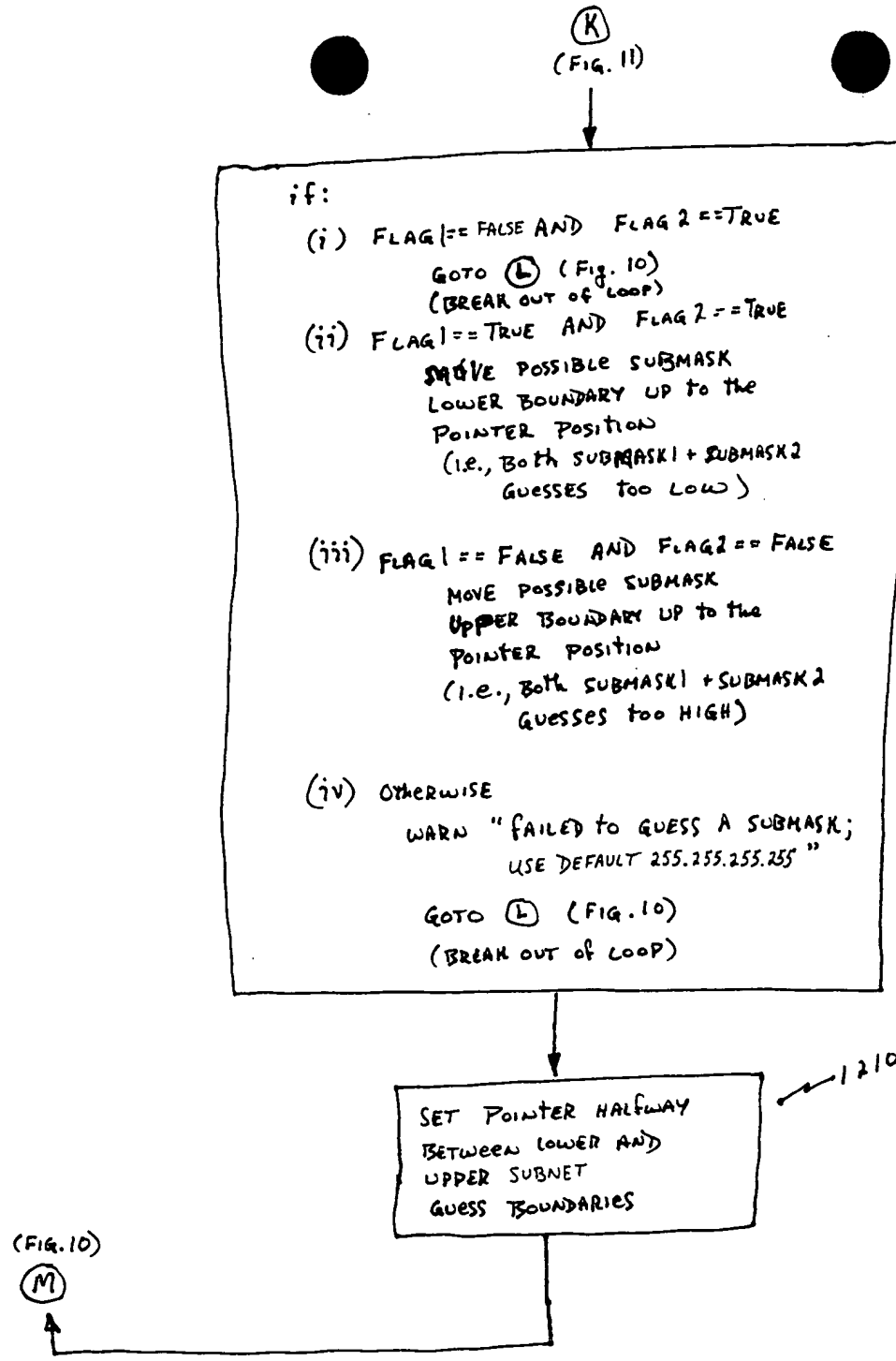

FIG. 12

P/O STEP 6

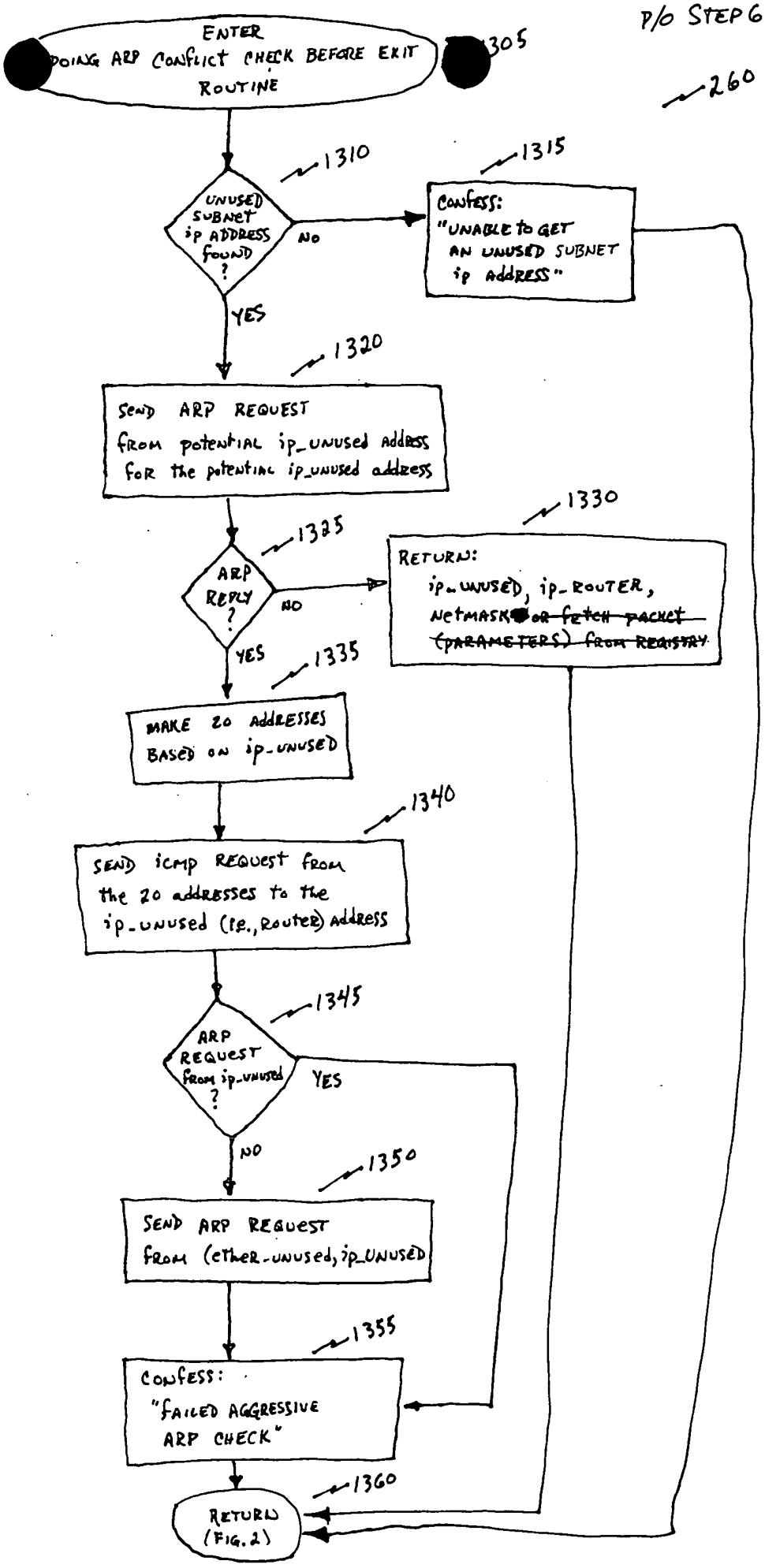

FIG. 13

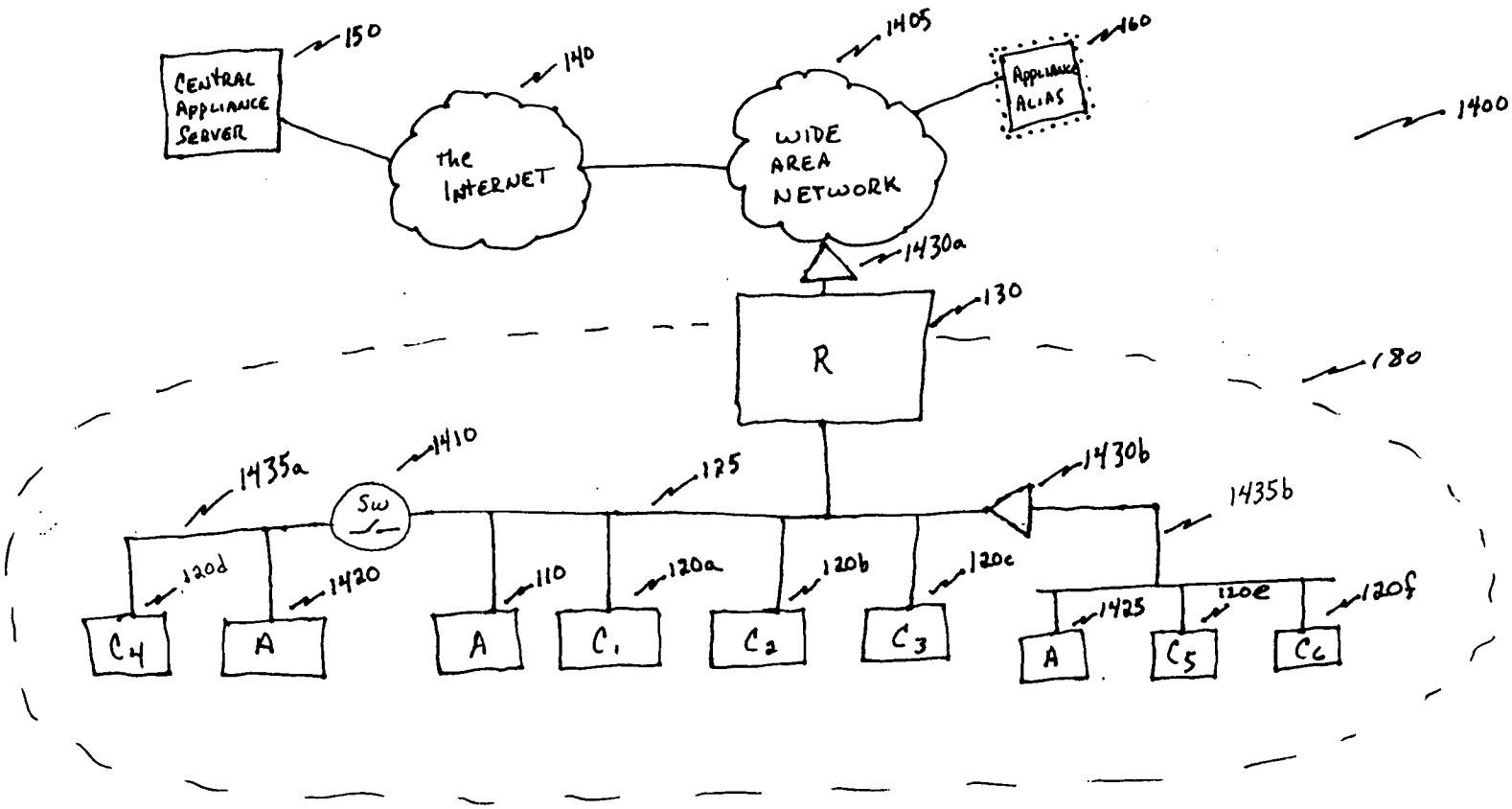
CENTRAL APPLIANCE SERVER
150
140
the INTERNET
1405
WIDE AREA NETWORK
160
APPLIANCE ALIAS
1400
1430a
130
R
180
1435a
1410
SW
125
1430b
1435b
120d
1420
110
120a
120b
120c
1425
120e
120f
C4
A
A
C1
C2
C3
A
C5
C6

FIG. 14

00n2E0" 6Z25E560

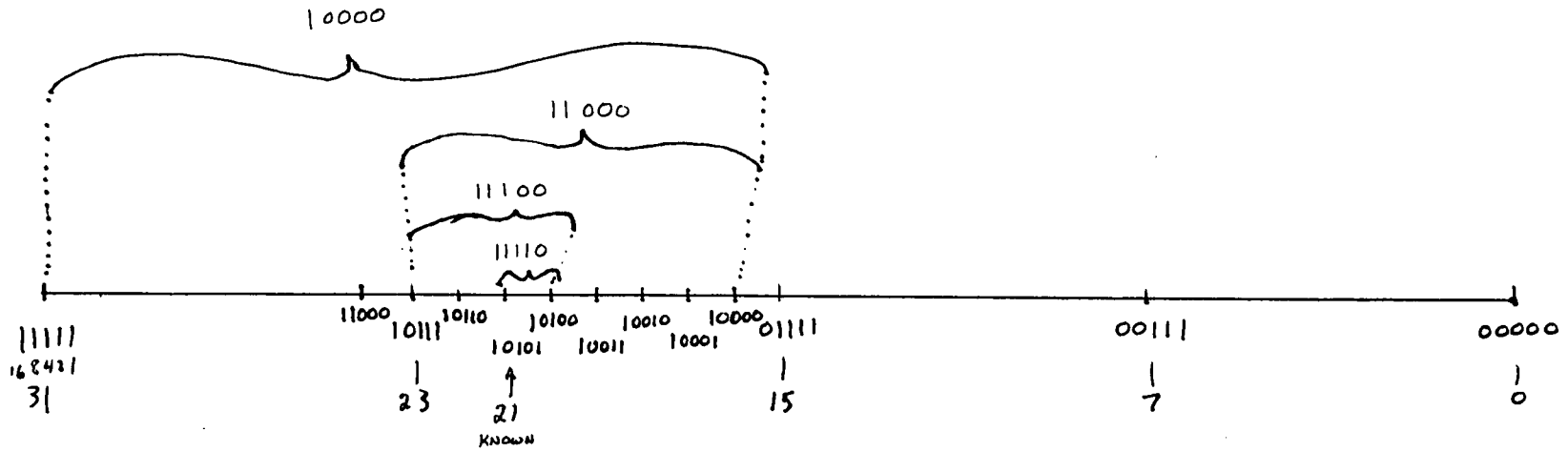

FIG. 15